

Claims

1. Automated storage system for storing and picking articles, comprising:
 - 5 a device for separating delivered articles into packing units and transferring the latter onto trays,
 - 10 a tray storage facility for storing the packing units on the trays,
 - a retrieval conveying system for removing and feeding the packing units in sequence for loading
 - 15 onto order load carriers, and
 - a loading station for loading the packing units in a defined loading sequence onto the order load carriers.
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2. Storage system according to claim 1, wherein in the tray storage facility one packing unit is situated on each tray.
- 25 3. Storage system according to claim 1, wherein the trays each have openings, through which lifting pins engage in order to lift a packing unit from the tray.
- 30 4. Storage system according to claim 1, having a pallet storage facility for storing the articles on

incoming load carriers.

5. Storage system according to claim 1, wherein the retrieval conveying system has a sorting device for trays.
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6. Storage system according to claim 1, wherein the retrieval conveying system comprises computer-controlled rack-mounted take-off machines.
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7. Storage system according to claims 1, wherein the tray storage facility is designed for storing trays of a plurality of defined dimensions.
- 15 8. Storage system according to claim 1, wherein the loading station has at least one loading machine for automated loading of the order load carriers with the packing units.
- 20 9. Storage system according to claim 8, wherein a plurality of, preferably four, retrieval paths of the retrieval conveying system are associated with each loading machine.
- 25 10. Storage system according to claim 8, having a rotary apparatus for rotating the trays and packing units situated thereon into a defined position for feeding to the loading machine.
- 30 11. Storage system according to claim 1, having a tray-vibrating device for defined positioning of a

packing unit on the tray.

12. Storage system according to claim 1, having a
packing-unit tilting device for tilting a packing
5 unit and for depositing the tilted packing unit on
the tray.
13. Storage system according to claim 1, having a load-
carrier tilting device for tilting load carriers
10 for the purpose of loading laterally enclosed load
carriers.
14. Storage system according to claim 1, wherein the
tray storage facility has storage modules for
15 collating the packing units into article groups.
15. Rack storage facility for storing articles,
comprising storage racks for storing trays, which
carry the articles and which each have openings for
20 removal of the article lying on the tray by means
of lifting means, which engage through the
openings.
16. Rack storage facility according to claim 15,
25 wherein one article is stored on each tray.
17. Rack storage facility according to claim 15,
wherein the storage racks are designed to store
trays having a plurality of predefined dimensions.
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18. Rack storage facility according to claim 15, having
rack-mounted storage/retrieval machines for the

automated selective removal of individual trays.

19. Rack storage facility according to claim 15, having
a lifting device with lifting pins for the removal
5 of an article from the tray.

20. Method of storing and picking articles in a storage
facility, comprising the steps:

10 (a) separation of the stored articles into packing
units,

(b) transfer of the packing units onto trays,

15 (c) storage of the packing units situated on the
trays in a tray storage facility used as a buffer,

(d) logging of a pick order and of the packing
units required to complete said order,

20 (e) retrieval of the packing units needed for the
pick order from the tray storage facility,

25 (f) sorting of the packing units into a defined
sequence, and

(g) transfer of the packing units onto order load
carriers in a loading order determined by the
defined sequence.

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21. Method according to claim 20, wherein one packing unit is stored on each tray.
22. Method according to claim 20 or 21, wherein trays
5 having a plurality of predefined dimensions are used for storage.
23. Method according to claim 20, wherein trays with through-openings are used for storage in the tray
10 storage facility.
24. Method according to claim 23, wherein the step (g) comprises the lifting of a packing unit from the tray by lifting means, which engage through the
15 through-openings.
25. Method according to claim 20, wherein the packing units are supported from below throughout the method steps (c) to (g).
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26. Method according to claim 20, wherein method step (g) is effected fully automatically.
27. Method according to claim 26, wherein the method
25 steps (a) to (f) are likewise effected fully automatically.
28. Method according to claim 20, further comprising the method step (h) of wrapping protective means
30 around the load stack formed on the order load carrier in step (g).

29. Method according to claim 20, wherein a loading aid is used for loading of the order load carrier.
- 5 30. Method according to claim 20, comprising the step of tilting a laterally enclosed order load carrier for the purpose of loading with the packing units.